

able to purchase the license."<sup>15</sup> Excluding likely efficient competitors, while encouraging other bidders to participate in the auctions, will result in lower bids and decrease the likelihood of developing commercial PCS products.

(11) In reaching the conclusion to limit the extent to which cellular providers could participate in PCS auctions, the FCC was "aware of the benefits that the cellular industry has to offer PCS. . .including capital, economies of scope, and experience and expertise in the provision of mobile communications services."<sup>16</sup> Therefore, restricting such a class of qualified firms from participating in the auctions imposes a cost on future development of PCS for which there does not appear to be an offsetting benefit.

(12) More competitors does not necessarily mean more competition for PCS licenses or in wireless markets. There is no evidence to suggest that fewer bidders for PCS licenses would exist if the cellular providers were allowed to participate, especially in light of the other safeguards in the FCC rules, which will be discussed later. The number of viable, vigorous bidders would be greater by including the cellular providers given the benefits these providers have to offer in developing and marketing wireless technologies. The auction process with cellular providers participating fully is consistent with the FCC's view that the auctions will "award licenses quickly to those parties who value them most highly and who are therefore most likely to introduce service rapidly to the public."<sup>17</sup> Furthermore, the FCC has stated that "[t]hese rules are intended to ensure that the competitive bidding process is limited to serious, qualified applicants."<sup>18</sup> To be consistent with this intent, the FCC should allow cellular providers to compete fully for PCS licenses.

(13) To understand the effect on revenue of restricting bidders in telecommunications auctions, I examined the round-by-round bidding data from the recently concluded auction for narrowband PCS licenses. In this auction, 10 licenses were awarded to six major paging firms. The total revenue generated from the auction was \$617,006,674. From the round-by-round bid data, I eliminated all bids for any license made by any of the six eventual winning bidders. I then calculated the total revenue from the auction under the

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<sup>15</sup> Second Memorandum Opinion and Order, *op. cit.*, p. 26.

<sup>16</sup> Memorandum and Opinion and Order, *op. cit.*, p. 42.

<sup>17</sup> "Fifth Report and Order," Before the Federal Communications Commission in the matter of Implementation of Section 309(j) of the Communications Act—Competitive Bidding, PP Docket No. 93-253, released July 15, 1994, p. 4 (Fifth Report and Order).

<sup>18</sup> "Second Report and Order," Before the Federal Communications Commission in the matter of Implementation of Section 309(j) of the Communications Act—Competitive Bidding, PP Docket No. 93-253, released April 20, 1994, p. 6 (Second Report and Order).

assumption that the next highest bidder for each license would have been awarded that license at its highest bid price. The total revenue for the ten licenses would be \$428,227,541 or \$188,779,133 less than the actual revenue. In other words, if the FCC had precluded the six bidders who had the highest bids for the narrowband PCS licenses from the auction, the revenue from the auction would likely have been reduced by 30.6 percent.<sup>19</sup> See Attachment B. If the magnitude of the effect of restricting bidders in the broadband PCS auction is the same as the above effect for the narrowband auction, an estimate of the loss of revenue to the U.S. government from the cellular eligibility and spectrum cap rules is \$5.6 billion.<sup>20</sup>

**C. Competitive Concerns are Not Well-Founded**

(14) All else equal, restricting firms from participating in a new technology entails potential losses in economic efficiency. There is a risk of losing the most efficient provider of a good or service. Therefore, a policy of restricting a market participant should be carefully evaluated. In particular, the cellular eligibility and spectrum cap rules represent the FCC's attempt to strike a balance between possible efficiency gains from including experienced firms in the bidding for PCS licenses and possible efficiency losses from anticompetitive activity due to the horizontal overlap between cellular services and PCS. The specific competitive concerns raised by the FCC are "to prevent undue market concentration, spectrum warehousing and to promote economic opportunity."<sup>21</sup>

(15) There are two types of costs from restricting an efficient competitor and inhibiting the competitiveness of the auction to determine who will supply a good or service. First, there is a cost due to inadequate bidding competition. This would yield bid prices lower than necessary. Second, there is a cost from restricting an efficient provider of the underlying good or service that could translate into higher production costs on every unit of the good or service subsequently provided.

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<sup>19</sup> There would be five "winners" of the 10 licenses in this auction. In deriving this estimate of the effect of excluding bidders from the narrowband PCS auction, I chose the next highest bid by any non-winning bidder. This may understate the impact of excluding bidders since winners submitted bids that generated counter-bids by the other participants. If the eventual winning bidders had not participated in the auction at all, there may have been fewer counter-bids and thus lower bids overall. Therefore, I also calculated the highest bid by a non-winner for which no other non-winning bidder submitted a counter-bid. This methodology yields an estimated revenue loss of \$228,182,054 or 37 percent of the revenue actually generated in narrowband PCS auction.

<sup>20</sup> I divided the revenue loss by the revenue estimate after excluding specific bidders and multiplied this ratio by the estimate of the revenue anticipated from the broadband PCS auction as reported by the FCC. The estimate reported by the FCC is \$12.6 billion. See Fifth Report and Order, *op. cit.*, p. 13.

<sup>21</sup> *Ibid.*, p. 30.

(16) Allowing cellular providers to compete fully for broadband PCS licenses reduces the likelihood that an efficient provider will be excluded from the market. Permitting existing cellular providers to participate fully fosters service diversity, facilitates a more rapid development of the service, and potentially lowers production costs through economies of scope with existing services. For example, cellular providers will be able to provide microcellular services their existing systems may not be able to provide efficiently. In addition, avoiding restrictions based upon current provision of competing services or ownership of licenses keeps an arbitrary and potentially awkward distinction out of the FCC regulatory process.<sup>22</sup> I will examine each of the FCC's potential anticompetitive concerns below.

### 1. Concentration and Competition

(17) The FCC stated that restricting cellular providers from participating in auctions for PCS licenses was "necessary to achieve our [FCC] goal of maximizing the number of new viable and vigorous competitors in PCS."<sup>23</sup> The Department of Justice (DOJ) and FTC Merger Guidelines state "[m]arket concentration is a function of the number of firms in a market and their respective market shares."<sup>24</sup> In the Guidelines, the DOJ and FTC use the Herfindahl-Hirschman Index (HHI) to measure market concentration since,

[u]nlike the four-firm concentration ratio, the HHI reflects both the distribution of market shares of the top four firms and the composition of the market outside the top four firms. It also gives proportionately greater weight to the market shares of the larger firms, in accord with their relative importance in competitive interactions.<sup>25</sup>

If one assumes cellular mobile telephone services and cellular interexchange services constitute relevant markets, the degree of concentration as measured by the HHI is lower in the two-firm cellular markets, where both firms have approximately equal market shares, than in the cellular interexchange markets in which AT&T has a dominant share. To analyze this issue, I calculated the HHI for the wireline and non-wireline cellular providers in the top 50 MSAs in

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<sup>22</sup> It thus avoids administrative costs for the FCC.

<sup>23</sup> Memorandum Opinion and Order, *op. cit.*, pp. 42-43.

<sup>24</sup> "Department of Justice and Federal Trade Commission Horizontal Merger Guidelines," April 2, 1992, p. 28 (Guidelines). "Prior to 1970, the collusion model of market power, implying a positive concentration/profitability relationship, held sway. Since at least 1977, the emphasis has shifted toward the market-dominance problem, and the large market shares held by leading firms have become the focus of attention." P. Pautler, "A Review of the Economic Basis for Board-Based Horizontal Merger Policy," *Antitrust Bulletin*, Vol. 28, No. 3, Fall 1983, p. 649.

<sup>25</sup> Guidelines, *op. cit.*, p. 28.

terms of estimates of the number of subscribers for each provider. See Table 1 in Attachment C. In all of the MSAs, the value of the HHI was less than 6500, with the weighted average being 5253. By contrast, I calculated values of the HHI for the seven states where BellSouth provides cellular and landline services, based on actual market shares of cellular interexchange subscribers as of May 1994. The lowest HHI is 6625 in Kentucky, where AT&T had an 81 percent share. In Alabama, AT&T's dominant share is 88 percent and the corresponding value of the HHI is 7795. In all instances, the value of the HHI exceeds 6500.<sup>26</sup> See Table 2 in Attachment C. Comparing the values of the HHI for two-firm and multiple firm markets reveals that more competitors does not necessarily mean lower market concentration, a primary indicia of competition.<sup>27</sup> The competitive balance that exists between the market shares of the facilities-based cellular providers suggests a more competitive market structure than the interexchange market with a dominant firm.<sup>28</sup> Given that there are only two allowed facilities-based cellular providers per service area, they appear to be competing. They would likely compete vigorously in the wireless market. The resulting HHIs in the wireless market with the cellular providers competing fully likely would be lower than in cellular interexchange today.<sup>29</sup> Furthermore, the FCC's view that more competitors is consistent with more competition is not supported by comparing cellular and cellular interexchange markets.

(18) Additional evidence on the competitive nature of the markets in which cellular providers operate is:

- Cellular markets have grown rapidly since 1984.
- The largest cellular firm in the U.S. is currently McCaw, a virtually unknown entity in telecommunications 10 years ago.

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<sup>26</sup> There are other measures by which to measure concentration (e.g. revenues or minutes of use) that may yield different results. For example, using data on toll duration converted, or MOU, for cellular interexchange in Richmond, Virginia, the shares of AT&T, MCI and Sprint were 71 percent, 18 percent and 11 percent respectively, for March 1994. The corresponding value of the HHI is 5486. See Guidelines, *op. cit.*, pp. 25-26.

<sup>27</sup> The Guidelines state lower levels of the HHI that cause the DOJ and FTC to scrutinize a merger. However, values of the HHI exceeding the stated levels merely signal that other factors should be examined such as entry conditions. See Guidelines, *op. cit.*, p. 30.

<sup>28</sup> J. Kwoka, "The Effect of Market Share Distribution on Industry Performance", *The Review of Economics and Statistics*, Vol. 61, No. 1, February 1979, pp. 101-109.

<sup>29</sup> Assuming unrestricted participation by cellular providers in obtaining PCS licenses and that one of the facilities-based providers in an area acquires a 30 MHz PCS license. The remaining cellular provider has 25 MHz spectrum for cellular services. If an ESMR provider has an additional 14 MHz of spectrum and the remaining PCS licenses (2-30 MHz and 3-10 MHz) are awarded to five separate entities, the HHI for this wireless market based on the 184 MHz of spectrum is 1756.

- Real consumer prices are falling for cellular services.<sup>30</sup>
- ESMR is available as a third competitor in wireless services.<sup>31</sup>
- By and large, states do not regulate cellular prices.<sup>32</sup>

## 2. Warehousing Spectrum

(19) Open eligibility will not inhibit entry and innovation in the wireless markets. The FCC's concern is that incumbent cellular providers might limit entry or suppress innovation. While it is conceivable that incumbent cellular firms could limit entry by acquiring licenses to inhibit potential competitors, there is no economic justification for this behavior without the incumbent possessing market power in the wireless markets. Such evidence has not been provided. Incumbent cellular firms would not spend resources attempting to limit entry. It would be too costly. "[S]ince licensees must purchase their licenses, they will have added economic incentives to construct their systems as rapidly as possible and introduce service to a significant percentage of the population."<sup>33</sup> Cellular providers would face the costs for licenses and construction (or penalties); thus, they would likely not warehouse spectrum.

(20) With two facilities-based cellular providers, at least one ESMR provider, the limits the FCC imposes on overall PCS spectrum (40 MHz) for a single provider, and the "Entrepreneur Blocks" set aside to encourage diversity of bidders,<sup>34</sup> there will be sufficient competition in wireless markets. The competitors would have sufficient capacity to limit an existing cellular provider's ability to maintain a supracompetitive price.

(21) Even if the incumbent firms possessed market power, they still would have an economic incentive to adopt a new technology rapidly if the new technology posed a competitive threat to their services. In the case of PCS, new entrants will market the new technology irrespective of the decisions of an integrated cellular-PCS firm. Thus, the integrated firm will have to adopt the new technology to compete effectively. PCS will likely include

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<sup>30</sup> *Telecommunications: Concerns About Competition in the Cellular Telephone Industry*, Washington: U.S. General Accounting Office, GAO/RCED-92-220, July 1992, p. 23.

<sup>31</sup> ESMR services offered by firms such as Nextel, which are available in Los Angeles today, will likely be operational in many areas within one year, the DOJ and FTC's time standard for including firms as market participants (*Guidelines, op. cit.*, p. 20).

<sup>32</sup> "State PUCs Plan to Petition FCC for Right to Continue Cellular Telephone Rate Regulation," *Telecommunications Reports*, August 8, 1994, p. 9. Eight states applied to the FCC to continue regulation: Arizona, California, Connecticut, Hawaii, Louisiana, New York, Ohio, and Wyoming.

<sup>33</sup> Memorandum Opinion and Order, *op. cit.*, p. 63.

<sup>34</sup> *Ibid.*, p. 4.

improved features over cellular. "[B]roadband PCS is expected to provide new mobile communications capabilities that are not currently available."<sup>35</sup> Commissioner Chong stated, "PCS clearly is going to be more than just portable telephone similar to cellular phones. Portable lightweight PCS devices will allow us to utilize wireless technology to send faxes or transfer computer files, receive a written urgent message on a pager, or pull up news, stock quotes or sports scores no matter where we are."<sup>36</sup> Cellular providers will not be able to remain viable wireless competitors without participating fully in the evolving wireless marketplace.<sup>37</sup>

### **3. Promote Economic Opportunity**

(22) Telecommunications services are an input into production of other goods and services, not an end product in themselves. Therefore, promoting economic opportunity is achieved by rapidly deploying new PCS technology, so that it can increase productivity in other segments of the U.S. economy. Economic growth will follow. Congress perceived this role of telecommunications services when it stated that one of its PCS objectives is to provide widespread access to telecommunications services.

(23) Excluding a class of viable, vigorous competitors from participating fully in this developing technology is inconsistent with promoting this economic opportunity. Economic growth is fostered by awarding the PCS licenses to those firms who value them highly and make the most efficient use of the spectrum. The cellular providers have the characteristics to develop and diffuse the complex telecommunications technology. They should not be handicapped in bidding for the PCS licenses.

### **4. Safeguards Exist in the FCC Rules**

(24) The FCC rules contain a number of other safeguards to alleviate concerns about anticompetitive behavior in the auction process and subsequently the wireless marketplace. They are sufficient to address any problems that would arise as a result of allowing cellular providers to participate fully in the auctions for PCS licenses. The cellular eligibility and spectrum cap rules are redundant in light of these safeguards.

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<sup>35</sup> Fifth Report and Order, *op. cit.*, p. 3.

<sup>36</sup> "Separate Statement of Commissioner Rachelle B. Chong," Re: In the Matter of Amendment of the Commissioner's Rules to Establish New Personal Communications Services—Memorandum Opinion and Order, GEN Docket No. 90-314, released June 13, 1994.

<sup>37</sup> Cellular providers may not be able to offer PCS in their cellular spectrum efficiently. The FCC created a continuous spectrum for PCS rather than the disjointed spectrum originally proposed in order to "increase competition, lower equipment costs and provide other benefits." See Memorandum Opinion and Order, *op. cit.*, p. 15.

**a. Auction Process**

(25) With regard to the auction process, the FCC will have the antitrust laws and its own rules to protect against anticompetitive behavior. "While we [FCC] intend to rely primarily on the antitrust laws to prevent bidding collusion, we believe that the anticollusion rules in the Second Report and Order will provide an important additional tool that will enable the Commission to detect, prevent and punish collusion."<sup>38</sup> As indicated in the above passage, the FCC has established "Rules Prohibiting Collusion."<sup>39</sup> In addition, the FCC will monitor on an auction-by-auction basis whether releasing information on bidders contributes to collusive behavior.<sup>40</sup> The antitrust laws and FCC collusion rules provide adequate protection against cellular firms colluding to warehouse spectrum.

(26) Upfront payments required from potential bidders will reduce frivolous bids. "[I]t is prudent to require bidders to submit upfront payments that represent the maximum level of bidding that they anticipate before the beginning of the auction."<sup>41</sup> There are also bid withdrawal and default penalties. "[T]he default penalty was set at 3 percent of the winning bid the next time the license is offered by the Commission, or 3 percent of the amount of the defaulting bidder's bid, whichever is less. . . [The withdrawal penalty is] the difference between the amount bid and the amount of the subsequent winning bid."<sup>42</sup> Such penalties deter warehousing spectrum since they make such strategic behavior costly.

(27) The FCC rules also provide that certain entities receive preferential treatment in the auction process. The preferences include tax certificates, bidding preferences, installment payment schemes. These entities include small businesses, women and minority-owned businesses and rural telephone companies.<sup>43</sup> These are referred to as "Designated Entities." As a result, these groups would be able to bid along side cellular providers. In addition, there are two blocks of spectrum (one 30 MHz and the other 10 MHz) designated as Entrepreneur Blocks. The cellular providers cannot bid for these blocks. These rules encourage competition and provide economic opportunity for a wide variety of potential bidders. The other likely

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<sup>38</sup> Second Memorandum Opinion and Order, *op. cit.*, p. 21.

<sup>39</sup> *Ibid.*, p. 21. These rules provide for limited forms of coordinated behavior (p. 22). See also the discussion of "Standby Queue," (p. 19).

<sup>40</sup> *Ibid.*, p. 19.

<sup>41</sup> *Ibid.*, p. 15.

<sup>42</sup> *Ibid.*, p. 16.

<sup>43</sup> Fifth Report and Order, *op. cit.*, pp. 69-87.

bidders (e.g. cable television firms) are sophisticated firms who are unlikely to be discouraged from bidding for PCS licenses even if cellular providers are eligible bidders as well. Therefore, the objective of a wide variety of applicants should be satisfied.

(28) As discussed above, the rule that an "entity may hold licenses for up to 40 MHz of PCS spectrum in that PCS service area"<sup>44</sup> would apply should cellular providers be allowed to compete fully in auctions for PCS licenses. This rule serves to limit concentration in resulting wireless markets.

**b. Post-Auction**

(29) Post-auction protection against anticompetitive behavior exists. The antitrust laws, FCC rules related to construction of the PCS system by winning bidders, and ongoing scrutiny the FCC will exercise in wireless markets will protect competition.

(30) The FCC has established construction requirements "to provide that (a) 30 MHz broadband PCS licensees must provide coverage to one-third of their service area population within five years of initial licensing and two-thirds within ten years and (b) 10 MHz licensees must provide coverage to 25 percent of their service area population within five years of initial licensing or, submit a showing of equivalent or substantial service."<sup>45</sup> These requirements will prevent warehousing of spectrum and provide rapid deployment of PCS. If the FCC subsequently determines competitive problems exist in the PCS industry, it could initiate a proceeding at that time without interfering in the market process now.

**V. BIDDING IN THE ELECTRICITY INDUSTRY**

(31) Competitive bidding in the electricity industry was introduced, in general, to provide alternatives to utilities constructing additional generating capacity, whereby utilities, independent power producers (IPPs) and qualifying facilities (QFs)<sup>46</sup> can compete to provide new capacity. Similar to the goals of the FCC with regard to PCS spectrum, the specific primary goals of the Federal Energy Regulatory Commission (FERC) in introducing competitive bidding were to promote economic efficiency, provide savings to ratepayers, allocate supply, simplify the administration of its regulatory policy and increase competition.<sup>47</sup> In fact, these

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<sup>44</sup> Memorandum Opinion and Order, *op cit.*, p. 41.

<sup>45</sup> *Ibid.*, p. 8.

<sup>46</sup> QFs are primarily cogenerators of electricity.

<sup>47</sup> J. Hamrin, "Pricing A New Generation of Power: A Report on Bidding," in *Competition in Electricity: New Markets and New Structures*, Arlington, VA: Public Utilities Report and QED Research, Inc., 1990, pp. 118-119.



objectives are currently being met in an environment that allows for "all sources" to participate in the auction process (no exclusion). The success of all-source bidding has expanded its use among buyers of power. "The current mix of buyers is much more diverse, including cooperative and publicly-owned [utility] systems in addition to the vertically integrated investor-owned utilities that dominated [issued] [an] earlier group of RFPs."<sup>48</sup>

(32) FERC's experience with auctions provides a source from which to learn lessons for auctioning PCS licenses. The first auctions were open only to QFs as defined by the Public Utilities Regulatory Policies Act of 1978 (PURPA). These QFs, much like many of the new potential entrants into the wireless telephone industry, are not subject to the regulations imposed on utilities. FERC quickly eased bidding structures to allow for experimenting and auction rules became more flexible. In a 1989 survey of 11 states, with bidding systems in place, more than half elected to allow all three entities (QFs, IPPs and utility subsidiaries) to participate in power auctions.<sup>49</sup> Regulators allowed the utility (subsidiary or not) to bid for its own supply. Risk of anticompetitive behavior in the form of self-dealing is addressed through oversight and other safeguards.<sup>50</sup>

(33) Advocates of utilities participating in auctions argue that "without such participation it will not be possible to capitalize on particular advantages that the utility may possess, including but not limited to control of particularly favorable plant sites, the ability to expand or refurbish existing plants cheaply, and access to skilled planning, engineering, and construction personnel."<sup>51</sup> These advantages are similar to those possessed by cellular providers. Thus, the experience with power auctions suggests all bidders should compete in PCS auctions. Cellular providers have developed knowledge of technology, and made considerable investments in infrastructure that make them viable participants in PCS auctions to achieve an efficient allocation of PCS spectrum.

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<sup>48</sup> R. Frame and M. Chellappa, *Recent Developments in North American Electric Generation Capacity Procurement Systems*, a NERA Report Prepared for Electricite de France, August 1994, p. 36.

<sup>49</sup> R. Rozek and L. Nordgulen, "The Importance of Flexibility in Competitive Resource Procurement," *The Electricity Journal*, Vol. 3, No. 5, June 1990, pp. 55-56.

<sup>50</sup> The conditions are as follows: the utility must use a sealed bid auction with the bids opened by an independent party, the utility must provide full justification for rejecting bids other than the subsidiary's bid, and unfair or abusive practices should result in reduction in the allowed rate of return or other sanctions. R. Rozek, "A Guide to the Economics of Bidding and Auction," *The Energy Journal*, Vol. 10, No. 4, October 1989, p. 134.

<sup>51</sup> R. Frame, "Design of Capacity Procurement Systems," a NERA Report Prepared for Electricite de France, January 1991, p. 5.

(34) The FCC's concerns over market concentration, warehousing spectrum and limited economic opportunity can be viewed in the context of the experience of the electric utility auctions. Open-participation has replaced regulation as a means of ensuring competition and energy efficiency. QFs have been successful in capturing opportunities under these conditions and have "demonstrated that a competitive market can exist in the generation of electricity."<sup>52</sup> "The collapse of traditional barriers to entry for non-utility generators has removed the 'natural monopoly' premise on which rate of return regulation has been built."<sup>53</sup> Under an open auction process, QF developers have been resourceful in their use of existing power surpluses to build future generation capacity. The high efficiency of the cogeneration technology used by the QFs along with the reluctance of investors to finance the traditional large nuclear and local plants has reduced utilities' advantages once derived from greater economies of scale and access to capital.

(35) Innovative, independent providers of electricity have arisen in the power generation industry without excluding utilities as bidders in power auctions. Similarly, non-cellular PCS bidders should be able to exploit economic opportunities even if cellular providers participate in the PCS auctions. In the case of utilities participating as buyer and seller, there is evidence that when the utilities are subject to the safeguards discussed above, they do not favor their own bids or engage in self-dealing.

(36) In general, the literature on energy bidding suggests that "all source" bidding, which includes utilities, QFs and IPPs, promotes competition, diversity, and rapid development of alternative power sources.

Price bidding offers a means of giving all potential players entry to competition in a deregulated environment. . . .

[P]rice bidding offers a fair and objective mechanism for allowing utilities and non-QF independent power producers to compete with QFs in supplying new capacity. Specifically, it gives utilities a way to get back into the business of new construction from which they are being gradually excluded in many states.<sup>54</sup>

Allowing competition among all sources is the lesson for the FCC to draw from the experience in power auctions.

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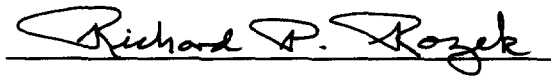
<sup>52</sup> J. Hamrin, *op. cit.*, pp. 121-122.

<sup>53</sup> *Ibid.*, p. 122.

<sup>54</sup> J. Hamrin, *op. cit.*, p. 122.

## VI. CONCLUSION

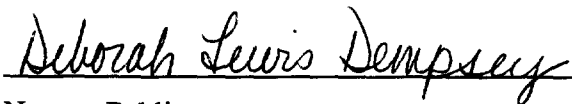
(37) The FCC and Congress have enumerated goals or objectives to be achieved in licensing the broadband PCS spectrum. By and large, these goals would be achieved by allowing cellular providers to participate fully in the upcoming auctions. That is, cellular providers should not be restricted differentially in terms of the type of PCS license on which they are allowed to bid. The costs of restricting cellular providers exceed the benefits.



Richard P. Rozek

Subscribed and sworn to before me

this 30<sup>th</sup> day of August 1994.



Notary Public

My Commission Expires April 30, 1995

# **ATTACHMENT A**

## **RICHARD P. ROZEK**

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Dr. Rozek received a B.A. degree in Mathematics with honors from the College of St. Thomas, a M.A. degree in Mathematics from the University of Minnesota, and M.A. and Ph.D. degrees in Economics from the University of Iowa.

Dr. Rozek began his professional career as an Assistant Professor at the University of Pittsburgh, where he taught industrial organization, mathematical economics and microeconomic theory. Dr. Rozek worked for over six years in the Bureau of Economics at the Federal Trade Commission in a series of senior staff positions including Deputy Assistant Director for Antitrust. While at the FTC, Dr. Rozek gained experience with antitrust and regulatory issues involving a variety of industries including electric and gas utilities, petroleum, soft drinks, for-profit and nonprofit hospitals, motion pictures and various high technology industries. Dr. Rozek also worked at the Pharmaceutical Manufacturers Association where he conducted research on issues such as the cost to develop a new drug, pharmaceutical industry profitability, benefits and costs of intellectual property protection, productivity of research and development personnel in the pharmaceutical industry, and reform of the health care reimbursement system.

Since joining NERA, Dr. Rozek has worked on projects involving regulated industries, including design of bidding processes for power generation markets and analysis of hospital rate regulation schemes; competition analyses in industries such as convenience food, electric equipment, electric utilities, health care, newspaper, pharmaceutical, telecommunications, and professional services; damage estimates in contract dispute, patent infringement, personal injury and libel cases; compensation issues in professional sports; and public policy studies in the pharmaceutical industry (intellectual property protection, parallel trade and pricing).

Dr. Rozek's articles have appear in such journals as *American Economist*, *Applied Economics*, *Contemporary Policy Issues*, *Electricity Journal*, *Energy Journal*, *Economics Letters*, *Journal of Economic Integration*, *Journal of Economics*, *Mathematical Modelling*, *Metroeconomica* and *Research Policy*.

### **EDUCATION:**

UNIVERSITY OF IOWA  
Ph.D., Economics, 1976  
M.A., Economics, 1974

UNIVERSITY OF MINNESOTA  
M.A., Mathematics, 1971

COLLEGE OF ST. THOMAS  
B.A., Mathematics, 1969 (cum laude)

**EMPLOYMENT:**

- 1991- NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC.--Washington, D.C.  
Vice President.
- 1987-91 Senior Consultant. Worked on projects involving regulated industries including design of bidding processes for power generation markets and analysis of hospital rate regulation schemes; competition analyses in industries such as convenience food, electric equipment, electric utility, hospital, newspaper, pharmaceutical, telecommunications and professional services; damage estimates in contract dispute, patent infringement, personal injury and libel cases; compensation issues in professional sports; and public policy studies in the pharmaceutical industry (intellectual property protection, parallel trade and pricing).
- 1985-87 PHARMACEUTICAL MANUFACTURERS ASSOCIATION--Washington, D.C.  
Senior Analyst, Economics. Analyzed issues affecting the research based pharmaceutical industry including intellectual property protection, costs and benefits of pharmaceutical therapies, the cost to develop a new pharmaceutical product, industry profitability and Medicare/Medicaid reform.
- 1979-85 FEDERAL TRADE COMMISSION--Washington, D.C.  
Staff Economist, Antitrust and Regulatory Analysis Divisions, Bureau of Economics. Analyzed antitrust and regulatory issues involving computers, hospitals, oil, public utilities, securities (stock and futures), soft drinks, and various consumer goods industries.
- 1982-83 Deputy Assistant Director for Antitrust, Division of Antitrust, Bureau of Economics. Supervised eight staff economists working on a broad set of antitrust matters.
- 1976-79 UNIVERSITY OF PITTSBURGH--Pittsburgh, Pennsylvania  
Assistant Professor, Department of Economics. Taught graduate and undergraduate courses in general equilibrium theory, mathematical economics, mathematics for economists, industrial organization, operations research and microeconomic theory; served on departmental committees; and supervised graduate student research projects.
- 1973-76 UNIVERSITY OF IOWA--Iowa City, Iowa  
Research Assistant, Teaching Assistant, Instructor, College of Business Administration.
- 1972-73 ST. MARY'S COLLEGE--Winona, Minnesota  
Instructor, Department of Mathematics. Taught undergraduate courses in number theory, integral and differential calculus, probability and statistics.
- 1969-72 UNIVERSITY OF MINNESOTA--Minneapolis, Minnesota  
Teaching Assistant, Department of Mathematics.

## PROFESSIONAL ACTIVITIES:

Publications and Speeches are listed in separate sections.

Referee for *Antitrust Bulletin* (1988 and 1992), *Applied Economics* (1983, 1984 and 1989), *Contemporary Policy Issues* (1991), *Managerial and Decision Economics* (1989), *Social Science Quarterly* (1987).

Invited Participant, U.S. Information Agency, American Participant Program in Argentina and Brazil, 1990.

Invited Discussant, Western Economic Association Annual Meeting, Economic Research at the FTC, 1986.

Invited Discussant, Illinois Institute of Technology, Center for the Study of Ethics in the Professions, Conference on Intellectual Property, 1985.

Invited Participant, Institute of Health Economics and Social Studies, Seminar on the Pharmaceutical Industry, 1978.

Awarded Summer Research Grant, University of Pittsburgh, Faculty of Arts and Sciences, 1978.

Invited Participant, Chicago Board of Trade, Summer Intern Program, 1977.

Received Commendation for Excellence in Teaching, University of Iowa, 1976.

Awarded Teaching and Research Assistantships, University of Minnesota and University of Iowa, 1969-1972 and 1973-1976, respectively.

Awarded HEW Scholarship, College of St. Thomas, 1965-1969.

Member, American Economic Association, Beta Gamma Sigma (National Honor Society in Business and Management), Delta Epsilon Sigma (National Scholastic Honor Society), Omicron Delta Epsilon (International Honor Society in Economics).

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"Setting The Economic Scene for the Next Seven Years: Health Care," speech before the Annual Meeting of the Actuarial Society of Greater New York, 1993.

"Parallel Trade in Pharmaceuticals: The Impact on Welfare and Innovation," speech before the Southern Economic Association Annual Meeting, 1992.

"The Use of Bidding and Auctioning Models in Competition Analyses," speech before the NERA Twelfth Annual Antitrust & Trade Regulation Seminar, 1991.

"Benefits and Costs of Intellectual Property Protection in Developing Countries," a series of speeches before academic, business and government groups in Argentina and Brazil, 1990; lecture to graduate students in the International Management Program at the University of Maryland, 1990; and presentation at a seminar sponsored by the Minister of Health in Turkey, 1992.

"Competitive Procurement of Generating Capacity: The Importance of Flexibility," speech before the Pacific Northwest Supply and Demand-Side Competitive Bidding Workshop, 1990; presentation at a Federal Energy Regulatory Commission Staff Seminar, 1990.

"Merger Analysis and Policy: Three Examples of Geographic Market Definition Under the DOJ Guidelines," speech before the NERA Tenth Annual Antitrust & Trade Regulation Seminar, 1989.

"Competitive Bidding in Energy Markets: A Policy Analysis," speech before the Eastern Economic Association Annual Meeting, 1989.

"Bibliometric Analysis of U.S. Pharmaceutical Industry Research Performance," speech before the Southern Economic Association Annual Meeting, 1987.

"Diversification by Nonprofit Firms: Competitive Implications," seminar presentations at the University of Hartford, University of Southern California and University of Iowa, 1987.

"Public Policy Issues Affecting the U.S. Pharmaceutical Industry," seminar presentation at Villanova University, 1987.

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Declaration and Reply Declaration on behalf of Xoma Corporation in the matter of *Xoma Corporation vs. Centocor, Inc.*, U.S. District Court for the Northern District of California, Civil Action No. C-90-1129-RHS, January 8, 1992 and March 7, 1992, respectively.

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August 1994

# **ATTACHMENT B**

**REVENUE LOSS IN NARROWBAND PCS AUCTION  
IF WINNING BIDDERS HAD BEEN EXCLUDED  
Determined Using Highest Bid By Non-Winner**

Market Number	Winning Bid [1]		Highest Bid Excluding Winners [2]		Revenue Loss ----- (Dollars) ----- (4)-(2) (5)
	Bidder ID	Bid Amount ---- (Dollars) ----	Bidder ID	Bid Amount ---- (Dollars) ----	
	(1)	(2)	(3)	(4)	(5)
N-1 [50-50KHz paired]	9065	\$ 80,000,000	5017	\$ 36,335,000	\$ (43,665,000)
N-2 [50-50KHz paired]	9065	80,000,000	5017	37,021,000	(42,979,000)
N-3 [50-50KHz paired]	5398	80,000,000	5017	36,335,000	(43,665,000)
N-4 [50-50KHz paired]	5398	80,000,000	1666	56,456,789	(23,543,211)
N-5 [50-50KHz paired]	7884	80,000,000	5017	60,727,000	(19,273,000)
N-6 [50-12.5KHz paired]	7561	47,001,001	2055	40,001,000	(7,000,001)
N-7 [50-12.5KHz paired]	1006	47,505,673	1666	44,000,012	(3,505,661)
N-8 [50-12.5KHz paired]	7884	47,500,000	5403	45,900,577	(1,599,423)
N-10 [50KHz unpaired]	9065	37,000,000	5403	35,725,577	(1,274,423)
N-11 [50KHz unpaired]	9683	38,000,000	5403	35,725,586	(2,274,414)
Total		\$ 617,006,674		\$ 428,227,541	\$ (188,779,133)

( ) negative

**Note** Winner refers to any firm which participated in the Narrowband PCS Auction and was awarded at least one license.

[1] Highest bid for which a license was awarded.

[2] Largest bid by a non-winning bidder.

Source: FCC Auction - Narrowband PCS, Nationwide Licenses, Final and Round Results.



## **ATTACHMENT C**